ORIGINAL

RADFORD ARMY AMMUNITION PLANT
PULASKI AND MONTGOMERY COUNTIES
VIRGINIA

DRAFT TRIP REPORT,
FLOW LABORATORY SITE

Submitted to:

Mr. Robert Thomson
Regional Project Manager
U.S. EPA Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

Submitted by:

TechLaw, Inc.
14500 Avion Parkway
Suite 300
Chantilly, VA 20151-1101

EPA Work Assignment No.	03-08
Contract No.	68-W-00-108
TechLaw PM	(b) (4)
Telephone No.	(b) (4)
EPA RPM	Robert Thomson
Telephone No.	215/814-3357

July 19, 2002

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ORIGINAL

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

ORIGINAL

1.0 INTRODUCTION

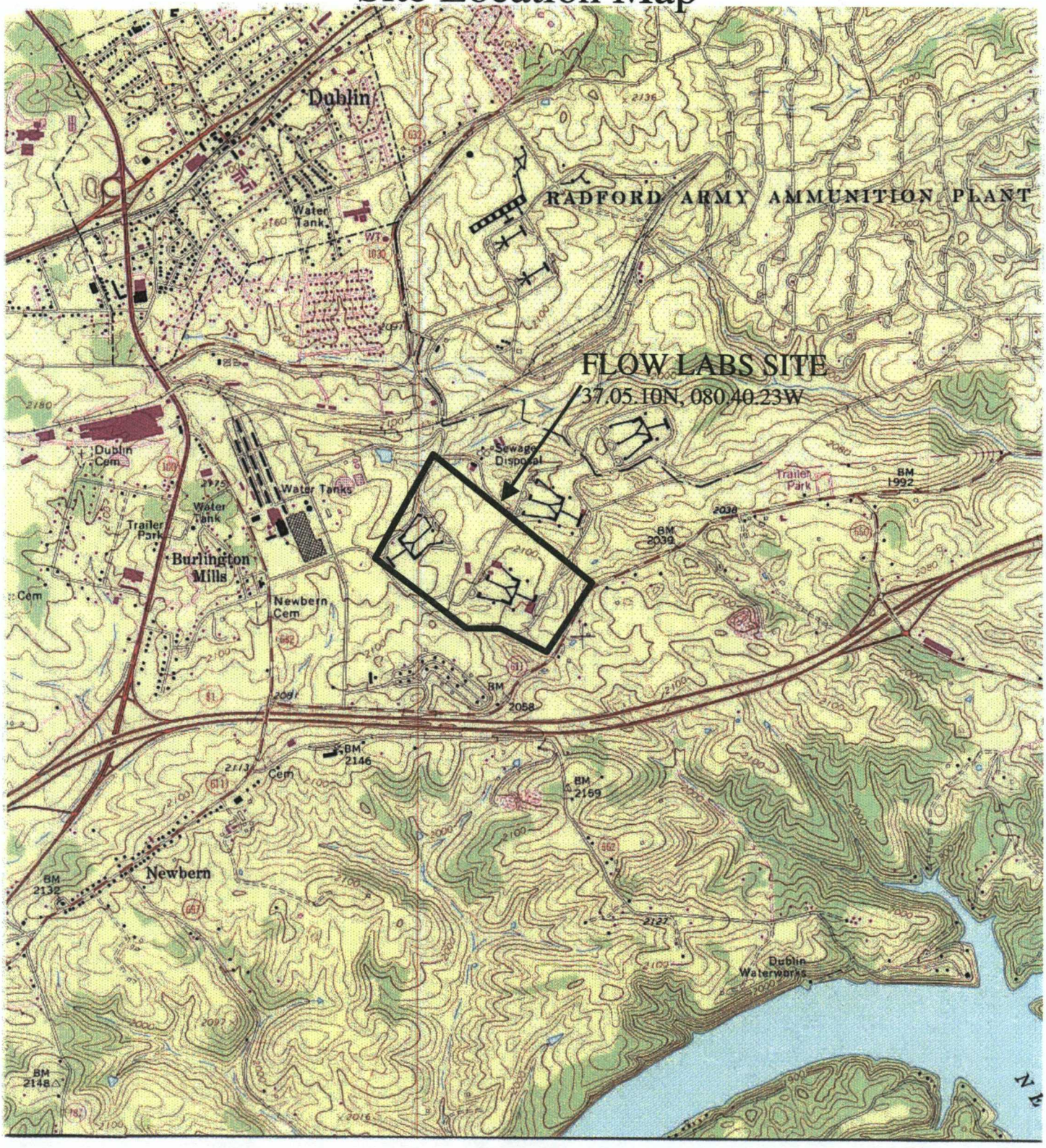
Under EPA Contract No. 68-W-00-108, Work Assignment No. 3-08, TechLaw, Inc. (TechLaw) is providing technical support and oversight activities during the planning and implementation of Expanded Site Investigations (ESIs), Non-time Critical Removal Actions (RAs), Remedial Investigations (RIs), Risk Assessments, and Feasibility Studies (FSs) for identified areas of concern at the Former New River Storage Depot (NRSD), Flow Laboratory Site (FLS) located in Pulaski, Virginia. The NRSD contains a portion of the current Radford Army Ammunition Plant.

TechLaw was tasked to conduct sampling at the NRSD, FLS (Figure 1-1). TechLaw conducted surface and sub-surface sampling at selected areas on the FLS with a team consisting of TechLaw and a geoprobe subcontractor Vironex Environmental Field Services, Inc. (Vironex).

This trip report presents a summary of the soil sampling activities conducted at the FLS April 16 and 29, 2002.

ORIGINAL

Figure 1-1
Site Location Map



USGS Quad1984 Dublin, Virginia Scale 1:24,000

2.0 BACKGROUND/SITE DESCRIPTION

The NRSD (also known as the New River Ordnance Plant) is located in Pulaski and Montgomery Counties, VA, near the community of Dublin. The NRSD originally consisted of 3,840 acres. Currently, a total of 2,813 acres are still operated as part of the Radford Army Ammunition Plant. The remaining acres, which were deeded or transferred to other owners or users, includes the FLS, which is currently owned by Mar-Bal, Inc.

The history of the NRSD dates back to the American Revolution. During WWII, the need for increased munitions production was the basis for opening the New River Ordnance Plant. The Government operated the plant under contract with Hercules Powder Co. of Wilmington, DE. The mission of this facility was the loading of propellant and igniter charges and the manufacture of the bags used for such charges.

During the post-war period, the War Assets Administration began disposal of portions of the former NRSD, starting as early as 1947-48 and continuing through 1978. Approximately 1,000 acres in the western portion of the original facility (including the FLS) had been sold or transferred during this period.

The Flow Laboratory appears to have begun activities on site approximately in 1970. This facility was owned and operated by Flow General Company, under the direction of their regional headquarters located in McLean, VA. Flow General operated nationwide and in 18 countries around the world. Their products included cell cultures, blood cells, bacteriological products, selected viral reagents, plastic labware, and instrumentation. In 1999, Gannett Fleming, Inc., discovered a 1983 product catalog during a site reconnaissance, which described the operations conducted at the Dublin facility. The catalog indicated that Flow Laboratory had the space and facilities to house all types of large and small animals. Complete blood cell product services, including selection, housing, and care of animals, test bleedings, inoculation, blood collection and serum preparation, according to requested customer protocols, were provided. Evidence of labware, petri dishes, sample vials, sample labels, and syringes were found during the site reconnaissance conducted by Gannett Fleming.

3.0 FIELD PERSONNEL

The TechLaw field team for the April 16, 2002 independent soil sampling event consisted of Mr. (b) (4) (TechLaw Chantilly, VA), and (b) (4) (Field Team Leader, TechLaw Pennsville, NJ). (b) (4) (Vironex, Inc.) conducted geoprobe activities as a subcontractor for TechLaw. The April 29, 2002 re-sampling event was performed by (b) (4) (b) (4) r (TechLaw, Pennsville, NJ).

4.0 FIELD AND SAMPLING ACTIVITIES

4.1 INTRODUCTION

This section summarizes the field activities conducted April 16 and 29, 2002. A field log was maintained to document the field activities. Photographs are provided in Appendix A.

4.2 SAMPLING ACTIVITIES

The EPA Remedial Project Manager (RPM), Mr. Robert Thomson, and the TechLaw Project Manager, (b) (4) conducted a site reconnaissance visit on November 20, 2001. During this Site reconnaissance visit, numerous trenches and a mounded feature were found in wooded area located in the north/north east corner of the FLS. The objective for this sampling event was to evaluate suspect or previously disturbed areas of the FLS for possible hazardous substances contamination. The selection of sampling locations (see Figure 4-1) was based on information collected during the November 2001 reconnaissance visit. Samples collected during the soil sampling event on April 16, 2002, were analyzed for CLP Toxic Compound List (TCL) organics and Target Analyte List (TAL) metals. A summary of sample information can be found in Table 4-1.

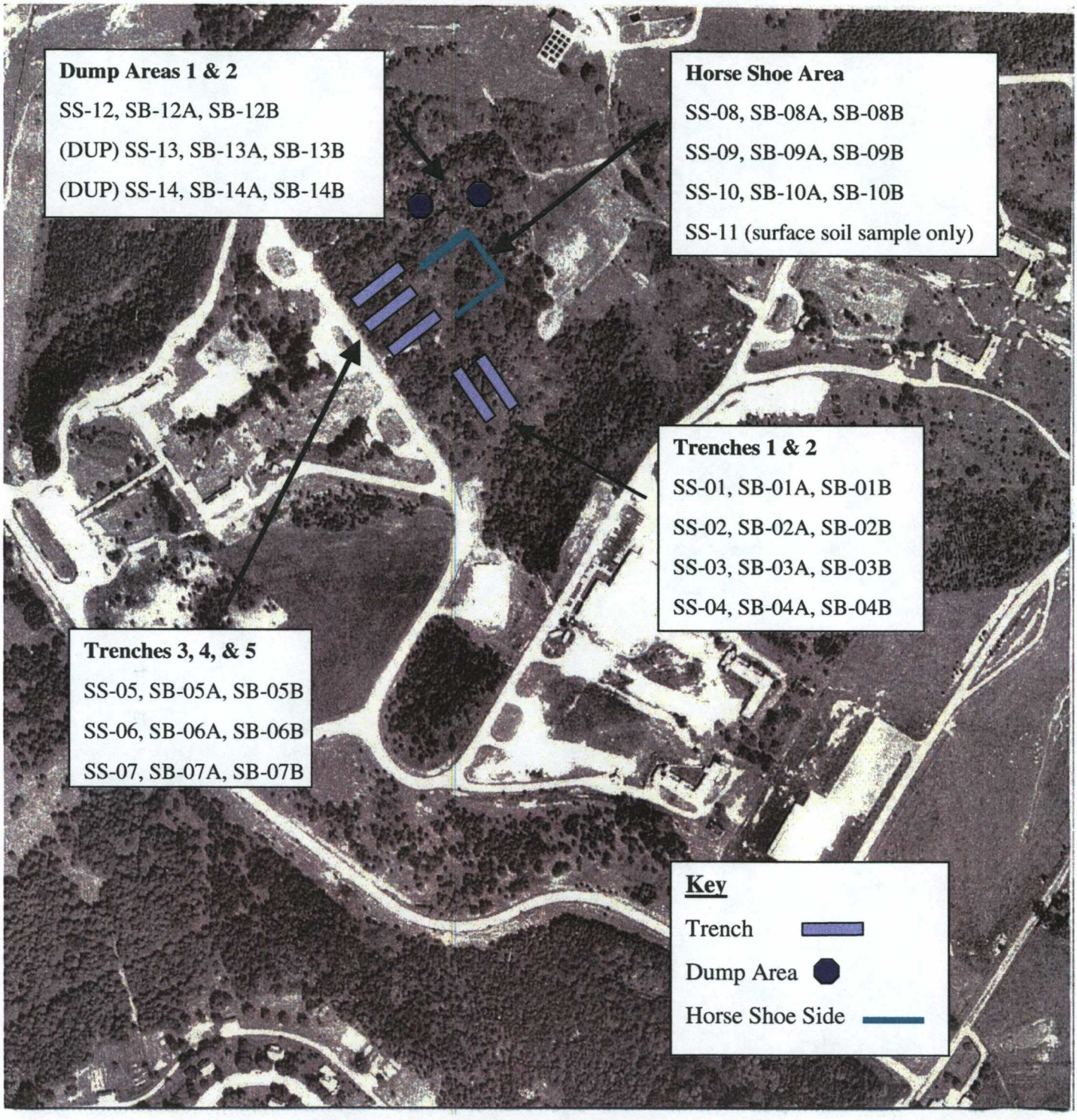
Three coolers containing samples from the FLS soil sampling were shipped to the CLP lab (Southwest Laboratories of Oklahoma) via FedEx. One of the coolers, containing the Encore (surface soil for VOC analysis) samples, was delayed because addressee labels were removed during transit and FedEx returned them to the TechLaw office in Chantilly. The samples were re-iced and sent to the laboratory for Saturday delivery. However, the samples were not usable because the Encore samples exceeded the holding time for preparation of the samples. TechLaw filed a claim on April 26 against FedEx to recover the cost of the rejected samples.

Upon discussions with EPA, on April 29, 2002, TechLaw re-sampled the surface soils for VOC analysis at all previously sampled locations. It was decided that if high concentrations of VOCs were observed in the April 29, 2002 surface soil samples, TechLaw would re-sample the subsurface soils. However, only one VOC, trichlorofluoromethane, was detected in 2 of the 14 surface soil samples collected on April 29, 2002 and both results were well below the RBC levels.

The field team was unable to collect samples in the middle of the Horse Shoe Area (samples SS-11, SB-11A and SB-11B) on the April 16, 2002 sampling trip due to the presence of standing water. However, on the April 29, 2002 sampling trip (to re-sample the surface soil), a surface soil sample was obtained (SS-11, VOC analysis only).

Three soil horizons were sampled during the April 16, 2002 event. Samples coded SS, were surface (0-6 in.) samples. Samples coded SB-XXA, were subsurface (0 - 4 ft.), and Samples coded SB-XXB, were subsurface (4 - 8 ft.).

Figure 4-1
Sample Location Map



Aerial Photographic Overflight, Flow Labs Site, September 21, 1981. Approximate Scale 1:4,260

Table 4-1: Summary of Sample Information - April 2002
Flow Laboratory Site, Radford Army Amunition Plant,
Pulaski and Montgomery Counties, Virginia

TechLaw Sample Number	CLP and DAS Sample Numbers	Matrix	Total Metals	VOCs	SVOCs/ Pesticides/ PCBs
Flow Laboratory Site					
SS-01	MC0QJ6, C0QN9, C0003	Soil	X	X	X
SB-01A	MC0QJ7, C0QP0	Soil	X		X
SB-01B	MC0QJ8, C0QP1	Soil	X		X
SS-02	MC0QJ9, C0QP2, C0004	Soil	X	X	X
SB-02A	MC0QK0, C0QP3	Soil	X		X
SB-02B	MC0QK1, C0QP4	Soil	X		X
SS-03	MC0QK2, C0QP5, C0005	Soil	X	X	X
SB-03A	MC0QK3, C0QP6	Soil	X		X
SB-03B	MC0QK4, C0QP7	Soil	X		X
SS-04	MC0QK5, C0QP8, C0006	Soil	X	X	X
SB-04A	MC0QK6, C0QP9	Soil	X		X
SB-04B	MC0QK7, C0QQ0	Soil	X		X
SS-05	MC0QK8, C0QQ1, C0007	Soil	X	X	X
SB-05A	MC0QK9, C0QQ2	Soil	X		X
SB-05B	MC0QL0, C0QQ3	Soil	X		X
SS-06	MC0QL1, C0QQ4, C0008	Soil	X	X	X
SB-06A	MC0QL2, C0QQ5	Soil	X		X
SB-06B	MC0QL3, C0QQ6	Soil	X		X
SS-07	MC0QL4, C0QQ7, C0009	Soil	X	X	X
SB-07A	MC0QL5, C0QQ8	Soil	X		X
SB-07B	MC0QL6, C0QQ9	Soil	X		X
SS-08	MC0QL7, C0QR0, C0010	Soil	X	X	X
SB-08A	MC0QL8, C0QR1	Soil	X		X
SB-08B	MC0QL9, C0QR2	Soil	X		X
SS-09	MC0QM0, C0QR3, C0011	Soil	X	X	X
SB-09A	MC0QM1, C0QR4	Soil	X		X
SB-09B	MC0QM2, C0QR5	Soil	X		X
SS-10	MC0QM3, C0QR6, C0012	Soil	X	X	X
SB-10A	MC0QM4, C0QR7	Soil	X		X
SB-10B	MC0QM5, C0QR8	Soil	X		X
SS-11	C0013	Soil		X	
SS-12	MC0QM6, C0QR9, C0014	Soil	X	X	X
SB-12A	MC0QM7, C0QS0	Soil	X		X
SB-12B	MC0QM8, C0QS1	Soil	X		X
SS-13	MC0QM9, C0QS2, C0015	Soil	X	X	X
SB-13A	MC0QN0, C0QS3	Soil	X		X
SB-13B	MC0QN1, C0QS4	Soil	X		X
SS-14[1]	MC0QN2, C0QS5, C0016	Soil	X	X	X
SB-14A[1]	MC0QN3, C0QS6	Soil	X		X
SB-14B[1]	MC0QN4, C0QS7	Soil	X		X
Blanks					
TB	C0QS9, C0002	Trip Blank		X	
FB	MC0QN5, C0QS8, C0001	Field Blank	X	X	X

[1] Duplicate for all parameters.

4.3 HEALTH AND SAFETY PLAN

Field activities were conducted according to the procedures described in TechLaw's *Flow Laboratory Site Final Soil Sampling and Task-specific Health and Safety Plans*, March 2002.

4.4 SAMPLE ANALYSIS

The laboratories and analytical methods used for the April 2002 soil sampling events are listed below:

- Liberty Analytical Corporation, Cary, North Carolina - RAS Case Number 30388: CLP TAL Total metals by ILMO4.1
- Southwest Labs of Oklahoma, Broken Arrow, Oklahoma - RAS Case Number 30388: Volatile, Semi-volatile and Pesticides/PCBs by CLP SOW OLM04.2

5.0 RESULTS

Six metals (aluminum, arsenic, chromium, iron, manganese, and vanadium), aldrin, alpha-BHC, alpha-Chlordane, beta-BHC, Lindane, heptachlor, heptachlor epoxide, benzaldehyde, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ehtylhexyl)phthalate, chrysene and indeno(1,2,3-cd)pyrene exceeded the human health risk screening values (Table 5-1). Additionally, cobalt, copper, lead, magnesium, mercury, nickel, selenium, zinc, 4,4'-DDE, endrin, methoxychlor, benzo(g,h,i)perylene, fluoranthene, phenanthrene and pyrene exceeded the ecological screening values (Table 5-1). An explanation of the Table 5-1 columns is provided in Table 5-2. The compounds and sample locations for the compounds exceeding the human health risk screening values are summarized in Table 5-3.

The summary data forms from the data validation reports are provided in the following appendices:

- Appendix B - TAL metals;
- Appendix C - TCL VOCs, TCL SVOCs, and TCL Pesticides/PCBs (tentatively identified compound data sheets are also included).

ORIGINAL

Table 5-1: Data Summary Table of Soil Samples Collected at the Flow Laboratory Site, Radford Army Amunition Plant, Pulaski and Montgomery Counties, Virginia

Samples: SS-01, SB-01A, SB-01B, SS-02, SB-02A, SB-02B, SS-03, SB-03A, SB-03B, SS-04, SB-04A, SB-04B, SS-05, SB-05A, SB-O5B, SS-06, SB-06A, SB-06B, SS-07, SB-07A, SB-07B, SS-08, SB-08A, SB-O8B, SS-09, SB-09A, SB-09B, SS-10, SB-10A, SB10B, SS-11, SS-12, SB-12A, SB-12B, SS-13, SB-13A, SB-13B, SS-14, SB-14A, SB-14B

				Screening Concentrations			
		Range of Detected Concentrations		RBSC Residential Soil	EPA SSL Soil Migration to	EPA Region III BTAG Soil (3)	
Contaminant	Frequency of Detection	Minimum (µg/g)	Maximum (µg/g)	Ingestion (1) (µg/g)	Groundwater (2) (µg/g)	Flora (µg/g)	Fauna (µg/g)
Inorganics - Total							
Aluminum	39 / 39	6,930	40,600	**7.80E+03**		**1.00E+00**	
Arsenic	39 / 39	4.3	33	**4.30E-01**	**2.60E-02**	3.28E+02	
Barium	39 / 39	3.9	219	5.50E+02	2.10E+03	4.40E+02	4.40E+02
Beryllium	35 / 39	0.44	5.8	1.60E+01	1.20E+03		
Cadmium	39 / 39	0.096	1.4	3.90E+00	2.70E+01	2.50E+00	
Calcium	34 / 39	89.7	113,000				
Chromium	39 / 39	8.2	60.9	**2.30E+01**	**4.20E+01**	**2.00E-02**	**7.50E-03**
Cobalt	39 / 39	1.9	145	1.60E+02		**1.00E+02**	2.00E+02
Copper	39 / 39	10.3	123	3.10E+02	1.10E+04	**1.50E+01**	
Iron	39 / 39	14,600	66,900	**2.30E+03**		**3.26E+03**	**1.20E+01**
Lead (4)	39 / 39	7.5	157	4.00E+02	7.50E+02	**2.00E+00**	**1.00E-02**
Magnesium	39 / 39	204	8,550			**4.40E+03**	**4.40E+03**
Manganese	39 / 39	47.3	1,760	**1.60E+02**	**9.50E+02**	**3.30E+02**	**3.30E+02**
Mercury	22 / 39	0.053	0.28			**5.80E-02**	**5.80E-02**
Nickel	39 / 39	3	35.5	1.60E+02		**2.00E+00**	
Potassium	39 / 39	351	6,840				
Selenium	36 / 39	0.58	1.8	3.90E+01	1.90E+01	**1.80E+00**	**1.80E+00**
Sodium	25 / 39	36.6	10,600				
Vanadium	39 / 39	20.9	171	**5.50E+01**	5.10E+03	**5.00E-01**	**5.80E+01**
Zinc	39 / 39	6.4	1,920	2.30E+03	1.40E+04	**1.00E+01**	
Volatiles							
Trichlorofluoromethane	2 / 14	4	5	2.30E+03	2.30E+01		
Pesticides/PCBs							
Aldrin	7 / 39	0.085	0.64	**3.80E-02**	**7.70E-03**	**1.00E-01**	**1.00E-01**
alpha-BHC	4 / 39	0.17	1.5	**1.00E-01**	**8.90E-04**		
alpha-Chlordane	13 / 39	1	5.3	**1.80E+00**	**9.20E-01**	**1.00E-01**	**1.00E-01**
beta-BHC	1 / 39	2.8	2.8	**3.50E-01**	**3.10E-03**		
4,4'-DDE	5 / 39	0.4	1.6	1.90E+00	3.50E+01	**1.00E-01**	**1.00E-01**
delta-BHC	2 / 39	2.1	3.4				
Endosulfan I	1 / 39	0.25	0.25	4.70E+01	2.00E+01		
Endosulfan II	1 / 39	0.49	0.49	4.70E+01	2.00E+01		
Endosulfan sulfate	2 / 39	7.6	7.9				
Endrin	1 / 39	0.31	0.31	2.30E+00	5.40E+00	**1.00E-01**	**1.00E-01**
Endrin aldehyde	1 / 39	5	5				
gamma-BHC (Lindane)	4 / 39	0.22	3.8	**4.90E-01**	**4.30E-03**		
Heptachlor	15 / 39	1.4	14	**1.40E-01**	**8.40E-01**		
Heptachlor epoxide	1 / 39	0.94	0.94	**7.00E-03**	**2.50E-02**	**1.00E-01**	**1.00E-01**
Methoxychlor	2 / 39	0.47	5.5	3.90E+01	3.10E+02	**1.00E-01**	**1.00E-01**
Semivolatiles							
Benzaldehyde	22 / 39	190	23000+	**7.80E+02**			
Benzo(a)anthracene	1 / 39	74	74	**8.70E-01**	**1.50E+00**	**1.00E-01**	**1.00E-01**
Benzo(a)pyrene	2 / 39	29	80	**8.70E-02**	**3.70E-01**		**1.00E-01**
Benzo(b)fluoranthene	3 / 39	27	97	**8.70E-01**	**4.50E+00**	**1.00E-01**	**1.00E-01**
Benzo(g,h,i)perylene	1 / 39	55	55			**1.00E-01**	**1.00E-01**
Benzo(k)fluoranthene	1 / 39	68	68	**8.70E+00**	**4.50E+01**	**1.00E-01**	**1.00E-01**
1,1'-Biphenyl	1 / 39	51	51				
bis(2-Ethylhexyl)phthalate	8 / 39	28	2100	**4.60E+01**	2.90E+03		
Caprolactam	1 / 39	31	31	3.90E+03			
Chrysene	3 / 39	28	110	**8.70E+01**	1.50E+02	**1.00E-01**	**1.00E-01**
Di-n-butylphthalate	3 / 39	23	73				
Di-n-octylphthalate	3 / 39	35	100				
Fluoranthene	7 / 39	28	210	3.10E+02	6.30E+03	**1.00E-01**	**1.00E-01**
Indeno(1,2,3-cd)pyrene	1 / 39	61	61	**8.70E-01**	**1.30E+01**	**1.00E-01**	**1.00E-01**
Phenanthrene	4 / 39	26	110			**1.00E-01**	**1.00E-01**
Pyrene	8 / 39	28	160	2.30E+02	6.80E+02	**1.00E-01**	**1.00E-01**

(1) Risk Based Concentration (RBC) values for residential soil ingestion taken from EPA Region III RBC Tables, April 2002, version. HQ = 0.1 for non-carcinogens; risk = 1.00E-006 for carcinogens.

(2) Soil Screening Levels (SSL) for transfer from soil to groundwater were obtained from EPA Region III RBC Tables, April 2002 version for a DAF of 20.

(3) Biological Technical Assistance Group (BTAG) values for soil screening are from August 1995 version.

(4) Lead OSWER Soil Screening Level for residential land use from "Revised Interim Soil Lead for CERCLA Sites and RCRA Corrective Action Facilities," July 1994.

Table 5-2: Explanation of the Data Summary Table
Flow Laboratory Site, Radford Army Amunition Plant,
Pulaski and Montgomery Counties, Virginia

Frequency of Detection	The number of samples in which a contaminant was detected above the detection limits followed by the total number of samples analyzed (including duplicates).
Range of Detected Concentrations	The minimum and maximum detected concentrations.
RBSC Residential Soil Ingestion	April 2002, EPA Region III RBCs Table. The RBSCs represent a hazard quotient (HQ) of 0.1 for non-carcinogens, and a cancer risk of $1x10^{-6}$ for carcinogens.
EPA Soil Screening Level (SSL) - Soil Migration to Groundwater	EPA Region III soil-to-groundwater SSLs (DAF=20) as provided in the April 2002, EPA Region III RBC table.
EPA Region III BTAG Soil and Aquatic Freshwater Levels	EPA Region III Biological Technical Assistance Group (BTAG) screening levels for soil and aquatic freshwater flora and fauna, August 1995.
Highlighted Cells	Highlighted cells are those for which concentrations detected in a sample exceeds one or more screening values (i.e., RBSC for Residential Soil Ingestion, BTAG Levels). The screening value(s) exceeded and the name of the compound are highlighted.

Table 5-3: Summary of Human Health Screening Exceedances for Soil Samples Collected April 2002 Flow Laboratory Site, Radford Army Amunition Plant, Pulaski and Montgomery Counties, Virginia

Contaminant	TechLaw Sample Number	CLP Sample Numbers	RBC Exceedance[1]	SSL Exceedance[2]
Aluminum	All Samples **except** SB-05B, SS-09 and SB-12B	All Samples **except** MC0QL0, MC0QM0 and MC0QM8	X	
Arsenic	All Samples	All Samples	X	X
Chromium	SS-01	MC0QJ6	X	
	SB-01A	MC0QJ7	X	
	SB-01B	MC0QJ8	X	X
	SB-02A	MC0QK0	X	
	SB-02B	MC0QK1	X	
	SB-03A	MC0QK3	X	
	SB-04A	MC0QK6	X	
	SB-04B	MC0QK7	X	
	SB-05A	MC0QK9	X	
	SB-05B	MC0QL0	X	
	SS-06	MC0QL1	X	
	SB-06A	MC0QL2	X	
	SB-06B	MC0QL3	X	X
	SB-07A	MC0QL5	X	
	SB-07B	MC0QL6	X	
	SS-08	MC0QL7	X	
	SB-08A	MC0QL8	X	
	SB-08B	MC0QL9	X	
	SS-09	MC0QM0	X	X
	SB-09A	MC0QM1	X	X
	SB-09B	MC0QM2	X	
	SS-10	MC0QM3	X	
	SB-10A	MC0QM4	X	X
	SB-10B	MC0QM5	X	
	SB-12A	MC0QM7	X	
	SS-13	MC0QM9	X	
	SB-13B	MC0QN1	X	
	SB-14B	MC0QN4	X	
Iron	All Samples	All Samples	X	
Manganese	SS-01	MC0QJ6	X	
	SS-02	MC0QJ9	X	
	SB-02A	MC0QK0	X	
	SS-03	MC0QK2	X	
	SB-03B	MC0QK4	X	
	SS-04	MC0QK5	X	
	SB-04B	MC0QK7	X	X
	SS-05	MC0QK8	X	
	SS-06	MC0QL1	X	
	SS-07	MC0QL4	X	
	SS-08	MC0QL7	X	
	SB-08B	MC0QL9	X	

Contaminant	TechLaw Sample Number	CLP Sample Numbers	RBC Exceedance[1]	SSL Exceedance[2]
	SS-09	MC0QM0	X	X
	SB-10B	MC0QM5	X	
	SS-12	MC0QM6	X	
	SS-13	MC0QM9	X	
	SS-14	MC0QN2	X	
Vanadium	SS-01	MC0QJ6	X	
	SB-01A	MC0QJ7	X	
	SB-01B	MC0QJ8	X	
	SB-02A	MC0QK0	X	
	SB-02B	MC0QK1	X	
	SB-03A	MC0QK3	X	
	SB-03B	MC0QK4	X	
	SB-04A	MC0QK6	X	
	SB-04B	MC0QK7	X	
	SS-06	MC0QL1	X	
	SB-06A	MC0QL2	X	
	SB-06B	MC0QL3	X	
	SB-07A	MC0QL5	X	
	SB-07B	MC0QL6	X	
	SB-08A	MC0QL8	X	
	SB-08B	MC0QL9	X	
	SB-09A	MC0QM1	X	
	SB-09B	MC0QM2	X	
	SS-10	MC0QM3	X	
	SB-10A	MC0QM4	X	
	SB-10B	MC0QM5	X	
	SB-12A	MC0QM7	X	
	SB-13B	MC0QN1	X	
Aldrin	SB-07B	C0QQ9	X	X
	SB-08A	C0QR1	X	X
	SB-08B	C0QR2	X	X
	SB-09A	C0QR4	X	X
	SB-10A	C0QR7	X	X
	SB-12A	C0QS0	X	X
	SB-12B	C0QS1	X	X
alpha-BHC	SS-08	C0QR0	X	X
	SS-13	C0QS2	X	X
	SB-14A	C0QS6	X	X
	SB-14B	C0QS7	X	X
alpha-Chlordane	SS-01	C0QN9	X	X
	SS-03	C0QP5	X	X
	SS-08	C0QR0	X	X
	SB-08B	C0QR2	X	X
	SB-09A	C0QR4	X	X
	SB-09B	C0QR5	X	X
	SS-10	C0QR6	X	X
	SB-10A	C0QR7	X	X
	SB-10B	C0QR8	X	X
	SB-12B	C0QS1	X	X
	SB-13A	C0QS3	X	X
	SB-14B	C0QS7	X	X

Contaminant	TechLaw Sample Number	CLP Sample Numbers	RBC Exceedance[1]	SSL Exceedance[2]
beta-BHC	SS-01	C0QN9	X	X
gamma-BHC (Lindane)	SS-09	C0QR3	X	X
	SS-12	C0QR9	X	X
	SS-13	C0QS2		X
	SS-14	C0QS5		X
Heptachlor	SB-01B	C0QP1	X	X
	SS-02	C0QP2	X	X
	SB-02B	C0QP4	X	X
	SS-03	C0QP5	X	X
	SB-03B	C0QP7	X	X
	SB-04A	C0QP9	X	X
	SB-04B	C0QQ0	X	X
	SS-05	C0QQ1	X	X
	SB-05A	C0QQ2	X	X
	SB-05B	C0QQ3	X	X
	SS-06	C0QQ4	X	X
	SB-06A	C0QQ5	X	X
	SB-06B	C0QQ6	X	X
	SS-07	C0QQ7	X	X
	SB-07A	C0QQ8	X	X
Heptachlor epoxide	SS-07	C0QQ7	X	X
Benzaldehyde	SS-01	C0QN9	X	
	SS-02	C0QP2	X	
	SB-02A	C0QP3	X	
	SB-02B	C0QP4	X	
	SS-03	C0QP5	X	
	SS-04	C0QP8	X	
	SS-07	C0QQ7	X	
	SB-07A	C0QQ8	X	
	SB-07B	C0QQ9	X	
	SS-08	C0QR0	X	
	SS-10	C0QR6	X	
	SS-12	C0QR9	X	
	SS-13	C0QS2	X	
	SS-13B	C0QS4	X	
	SS-14	C0QS5	X	
Benzo(a)anthracene	SS-12	C0QR9	X	X
Benzo(a)pyrene	SS-12	C0QR9	X	X
	SS-14	C0QS5	X	X
Benzo(b)fluoranthene	SS-05	C0QQ1	X	X
	SS-12	C0QR9	X	X
	SS-14	C0QS5	X	X
Benzo(k)fluoranthene	SS-12	C0QR9	X	X
bis(2-Ethylhexyl)phthalate	SS-08	C0QR0	X	
	SB-08B	C0QR2	X	
	SS-09	C0QR3	X	
	SS-10	C0QR6	X	
	SS-12	C0QR9	X	
	SS-13	C0QS2	X	

Contaminant	TechLaw Sample Number	CLP Sample Numbers	RBC Exceedance[1]	SSL Exceedance[2]
	SS-14	C0QS5	X	
Chrysene	SS-12	C0QR9	X	
Indeno(1,2,3-cd)pyrene	SS-12	C0QR9	X	X

[1] Risk Based Concentration (RBC) values for tap water ingestion taken from EPA Region III RBC Tables, April 2002, version. HQ = 0.1 for non-carcinogens; risk = 1.00E-006 for carcinogens.

[2] Soil Screening Levels (SSL) for transfer from soil to groundwater taken from EPA Region III RBC Tables, April 2002 version for a DAF of 20.

6.0 REFERENCES

EPA, 1995. *EPA Region III Biological Technical Assistance Group (BTAG) Screening Levels, August 1995.*

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ORIGINAL

Appendix A: Photograph Log

April 2002, Soil Sampling Events

RADFORD ARMY AMMUNITION PLANT
PULASKI AND MONTGOMERY COUNTIES
VIRGINIA

ORIGINAL

Soil Sampling – Flow Laboratories Site
Photographic Log

Photo 1: Sample Location SS1/SB1

Photo 2: Sample location SS1/SB1 looking down into the trench

ORIGINAL

Photo 3: View of 0-4' and 4'-8' horizon sample cores for SB1. The 0-4' horizon is on the far side.

Photo 4: SB1A/SB1B cores open for soil classification and sampling. Note the dense nature of the clay with depth.

Photo 5: Geoprobe setup at Sample Location SS2/SB2

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Photo 6: View of Sample Location SS1/SB1. Orange stake marks the sample location

Photo 7: 4 feet and 8 feet horizon cores from SB2

Photo 8: Geoprobe setup at Sample Location SS3/SB3

Photo 9: 4 feet and 8 feet horizon from SB3

Photo 10: SB3 4 feet horizon cut open for classification and sampling

Photo 11: SB3 48 feet soil horizon (near) cut open for classification and sampling

Photo 12: The geoprobe operator decontaminating the rods (far right)

Photo 13: Geoprobe setup at Sample Location SS4/SB4

Photo 14: SB4 four feet soil horizon cut open for classification and sampling.

Photo 15: SB4 four feet soil horizon (near) and eight feet horizon (far)

Photo 16: Geoprobe setup at Sample Location SS5/SB5

Photo 17: SB5 zero to one (near) and one to five feet (far) soil horizon. The first attempt result in a recovery of only one foot long sample.

Photo 18: SB5 eight feet soil horizon core (far)

Photo 19: Geoprobe setup at Sample Location SS6/SB6

Photo 20: SB6 four feet soil horizon core

Photo 21: SB6 eight feet soil horizon (far)

Photo 22: Geoprobe setup at Sample Location SS7/SB7

Photo 23: SB7 four feet soil horizon

Photo 24: SB7 refusal at 6.5 feet. The sample recovered (far) is from 4 feet to 6.5 feet. A cement-like material is visible at 6 feet (right end of core).

Photo 25: Geopropbe setup at the south end of the horseshoe area at Sample Location SS8/SB8. This sample was supposed to be collected on the west berm (left of the geoprobe) but due to access problems SS8/SB8 was relocated to the edge of the standing water, since the sample proposed at the center could not be collected due to the ponded water.

Photo 26: SB8 four feet soil horizon

Photo 27: SB8 eight feet soil horizon. Note the densely packed uniform and undisturbed clay.

Photo 28: Geoprobe setup at Sampling Location SS9/SB9

Photo 29: SB9 four feet soil horizon

Photo 30: SB9 eight feet soil horizon (far)

Photo 31: Geoprobe setup at Sample Location SS10/SB10

Photo 32: SB10 four feet soil horizon. Note the densely packed and undisturbed clay, except for the first four inches (left end) of clay with organic material.

Photo 33: SB10 eight feet soil horizon. This core exhibited some sand and was very dry.

Photo 34: Geoprobe setup at Sample Location SS12/SB12

Photo 35: SB12 eight feet soil horizon

Photo 36: Geoprobe setup at Sample Location SS13/SB13 – SS14/SB14. This is at the dump area with numerous tires and house hold articles.

Photo 37: SB13/14 four feet soil horizon. Except approximately 6 inches of dark organic and sandy soil at the shallow end (left) the core consists of redish-brown sandy silt and silty clay.

Photo 38: SB13/14 eight feet soil horizon. Note how dry the core is, except for the first 2 feet (left end). This location is very close to the horseshoe area.